VM Ocean

100|75|55 kHz

Delivers vessel-mounted ADCP capabilities with either an optional scientific echosounder for biomass measurements (100 kHz) or very long-range measurements (55 kHz)



Until now, epipelagic and mesopelagic VM ADCP surveys could not deliver the resolution, precision or range to examine the ocean boundary layer in detail. The VM Ocean system with the Signature100 ADCP enables biomass studies in the upper-ocean boundary layer simultaneous to current measurements, with a combined ADCP and scientific echosounder. The innovative dual-frequency design of the Signature55 ADCP allows for both very long-range (up to 1000m) current profiles as well as higher-resolution measurements.

Highlights

- Comprehensive, easy-to-use system
- Automated processing fir data viewing onboard
- Instrument allows for flexible deployments, either vessel-mounted or standalone
- Take both long-range and high-resolution measurements from one instrument with innovative dual-frequency transducers (Signature55)
- Profile currents up to 300m and gather biomass information with scientific echosounder (Signature100)

Applications

- Internal wave detection using echosounder (100 kHz)
- Upper-ocean boundary-layer studies, profiling up to 300m (100 kHz)
- Detection of krill or plankton in the water column (100 kHz)
- Deep-water current profiles (up to 1000m), ocean discharge (55 kHz)

Technical specifications

Water Velocity Measurements - Signature VM 100 kHz	
Profiling range**	300-400 m
Doppler processing	Broadband & Narrowband
Cell size	3-16 m
Max no. cells	200
Min. blanking	2
Minimum accuracy	1% of the measured value ± 0.5 cm/s
Velocity resolution	0.1 cm/s
Maximum sampling rate	1 Hz (1/3 Hz with BT and echosounder)
Velocity range (along beam)	5 m/s
No. of beams	4 slanted at 20°

Water Velocity Measurements - Signature VM 100 kHz

** Depending on acoustic scattering condition.

Water Velocity Measurements - Signature VM 75/55 kHz

Profiling range**	685/900-1000 m
Doppler processing	Broadband/Broadband & Narrowband
Cell size	5-20 m
Max no. cells	200
Min. blanking	2
Minimum accuracy	1% of the measured value ± 0.5 cm/s
Velocity resolution	0.1 cm/s
Maximum sampling rate	1 Hz
Velocity range (along beam)	5 m/s
No. of beams	3 slanted at 20°

** Depending on acoustic scattering condition.

Bottom velocity measurements - Signature VM 100 kHz

Single ping std @ 3 m/s	TBA
Long-term accuracy	TBA
Minimum altitude	5 m
Maximum altitude	540 m
Velocity resolution	0.01 mm/s
Maximum sampling rate	1/2 Hz (1/3 Hz with VP and echosounder)

Bottom velocity measurements - Signature VM 75/55 kHz

Single ping std @ 3 m/s	TBA
Long-term accuracy	TBA
Minimum altitude	50 m
Maximum altitude	1000 m
Velocity resolution	0.01 mm/s
Maximum sampling rate	1/2 Hz

Echo intensity (slanted beams) - Signature VM 100 kHz

Sampling	Same as velocity for slanted beams
Resolution/dynamic range	0.5 dB/70 dB
Dynamic range	70 dB slanted beams
Transducer acoustic frequency	100 kHz
No. of beams	4 slanted at 20°
Beam width	6.1°

Echo intensity (slanted beams) - Signature VM 75/55 kHz

Sampling	Same as velocity
Resolution/dynamic range	0.5 dB/70 dB
Dynamic range	70 dB slanted beams
Transducer acoustic frequency	75 and 55 kHz
No. of beams	3 slanted at 20°

Echo intensity (slanted beams) - Signature VM 75/55 kHz

Beam width	4.5°-5.5°

Echosounder option - Signature VM 100 kHz

No. of beams	1 vertical
Transducer acoustic frequency	70-120 kHz
Sampling	1 Hz (1/3 Hz with VP and BT)
Transducer beam width	15° @ 70 kHz, 8.7° @ 120 kHz
Resolution	0.375 –4 m
Resolution/ dynamic range	0.01 dB/130 dB
Transmit pulse	Monochromatic 70 kHz, 90 kHz and 120 kHz or frequency chirp (90 kHz, 50% BW)
Transmit power	7.5-120 W adjustable
Chirp signal processing	Pulse compression or binned frequency response

Echosounder option - Signature VM 75/55 kHz

No. of beams	N/A
Transducer acoustic frequency	N/A
Sampling	N/A
Transducer beam width	N/A
Resolution	N/A
Resolution/ dynamic range	N/A
Transmit pulse	N/A
Transmit power	N/A
Chirp signal processing	N/A

Other - Signature VM 100 kHz

Temperature sensor range / accuracy	-4 °C to 40 °C / 0.1 °C
Pressure	Piezo resistive
Standard range	0-1500 m (inquire for options)
Accuracy/precision	0.1% FS / Better than 0.002% of full scale
Compass and tilt	Solid-state magnetometer and accelerometer
Data recording	16 GB (inquire for options)
Data cable	10 m Ethernet cable. Other lenghts available
IO	Ethernet
DC input	24-48 V DC

Other - Signature VM 75/55 kHz

Temperature sensor range / accuracy	-4 °C to 40 °C / 0.1 °C
Pressure	Piezo resistive
Standard range	0-1500 m (inquire for options)
Accuracy/precision	0.1% FS / Better than 0.002% of full scale
Compass and tilt	Solid-state magnetometer and accelerometer
Data recording	16 GB (inquire for options)
Data cable	30 m Ethernet cable (inquire for options)
IO	Ethernet

Other - Signature VM 75/55 kHz

DC input	48 V DC

Dimensions - Signature VM 100 kHz

Maximum diameter	455 mm
Maximum length without room for internal batteries	392 mm
Weight in air	29 Kg (5 beams)

Dimensions - Signature VM 75/55 kHz

Maximum diameter	650 mm
Maximum length without room for internal batteries	314 mm
Weight in air	57 Kg

Environmental, Signature VM ADCP

Operating temperature	-4 °C to 40 °C
Storage temperature	-20 °C to 60 °C
Vibration	IEC 60068-1/IEC60068-2-64
EMC approval	IEC 61000
Depth rating	1500 m – Bottom track is limited to surface vessels
Connectors	Straight fitted MCBH6F (Ethernet)
Housing	Small instrument housing
Material	POM with titanium fasteners

Processing unit

Processor/memory	Intel i5/8 GB
Hard disk	SSD, 256 GB
Operating system	Windows® 11 IoT Ent LTSC
Housing	19" rack-mountable 2 HE
Dimensions	482x87x400 mm
Input	110-240 V AC, 100 W Max
Total weight	7 kg
Connections*	Power, Signature ADCP, 2x DisplayPort, 1x LAN, 2x USB, 4x RS232|RS422|RS485 configurable port*

* Processing unit requires heading and GNSS input over Serial or Ethernet

Nortek VM acquisition software

Acquisition input	Signature VM - binary, Advanced Navigation GNSS - binary, KM - binary, common NMEA
Timing	IEEE1588/PTP or NTP for absolute time stamping of Gyro/GNSS/Signature ADCP data or < 0.6 s under $ZDA NMEA
Configuration	Signature VM ADCP, Alignment offsets, Outputs
Display	Vessel track in map, Bottom-track velocity, Bottom-track depth, Velocity magnitude and direction, Echo amplitude (slanted beams), Echo correlation (slanted beams), corrected relative volume backscatter (100), Signature VM BT and VB + NMEA GGA, HDT, VTG
Status	Signature VM BT and VB + NMEA GGA, HDT, VTG

Nortek VM acquisition software

Output	Online: NMEA data formats. Offline: CSV, ASCII VMT, MATLAB, MATLAB VMT, MATLAB QRev, KML

AHRS option

Accelerometer dynamic	± 2 g
Gyro dynamic range	± 250°/sec
Magnetometer dynamic range	± 1.3 Gauss
Pitch and roll range/resolution	± 90° (pitch), ± 180° (roll)/0.01°
Pitch and roll accuracy	± 2° (dynamic)3), ± 0.5° (static, ± 30°)
Heading range / resolution	360°, all axes/0.01°
Heading accuracy	± 3° (dynamic)3), ± 2° (static, tilt < 20°)
Sampling rate	Same as measurement rate